
Space Weather Forecast

Issued on Saturday, 22 July 2023 at 01:03 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of Minor/Moderate blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only a few minor Common-class flares originating from different regions. There are currently six sunspot regions on the visible disc. The largest and most complex one is currently in the northwest quadrant but this region has recently lost its delta spot and has since been re-classified for something more simple magnetically speaking. There are three other large regions, two of which are on the western hemisphere.

No Earth-directed Coronal Mass Ejections (CMEs) were observed in the available imagery.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of a weak CME arrival at around 21/1925UTC. Solar wind speed jumped from 370 to 430km/s as the CME arrived, along with a sudden increase in the number of particles within it. The Interplanetary Magnetic Field became moderate when the CME arrived, with important negative deviations of the important north-south component. These resulted in geomagnetic activity being Quiet to Unsettled (Kp 0-3), with an Active (Kp 4) interval between 21/2100-2400 UTC.

Energetic Particles / Solar Radiation: Solar radiation levels were still declining after the recent radiation storm that occurred on the 18th but eventually came back to background levels during the second half of the period. It remains slightly enhanced though.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low with a chance of an isolated M-class flare. These are most likely from the largest and most complex region, but the large region in the northeast quadrant also makes a good candidate.

Solar Wind / Geomagnetic Activity: The CME that arrived around 21/1925UTC is expected to give minor impacts, with only a couple of Active intervals and perhaps a slight chance of a G1 (Minor Storm) interval in the early UTC hours of Day 1. Any influence from CH26/- is likely to be masked by the recent CME arrival but the HSS from CH27/- may connect with Earth on Day 3, with wind speeds of 450-500 km/s possible.

Overall, geomagnetic activity is expected to be Quiet to Unsettled for much of this period, with a chance of Active intervals on Day 1 (22 July) and at the end of Day 3 (24 July). A G1 (Minor Storm) interval is possible in the early UTC hours of Day 1.

Energetic Particles / Solar Radiation: The high energy (greater than 10MeV) proton flux is expected to continue to decline, reaching background levels, but with a slight chance of further increases should any larger flares occur. Later in the period there is a slight increase in the

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probability of S1 as the largest region rotates further across the western hemisphere.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	20	1	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)